

We claim:

- 1 1. An apparatus for use with a clamp including first and second
2 clamp members, the apparatus comprising:
3 a support device configured to be removably secured to at least
4 one of the first and second clamp members;
5 a coagulation element carried by the support device; and
6 a stimulation element carried by the support device.
- 1 2. An apparatus as claimed in claim 1, wherein the support device
2 includes a mating structure configured to mate with the first clamp member.
- 1 3 An apparatus as claimed in claim 2, wherein the support device
2 mating structure comprises a relatively narrow portion and a relatively wide
3 portion.
- 1 4. An apparatus as claimed in claim 1, wherein the coagulation
2 element defines a coagulation element configuration, the stimulation element
3 defines a stimulation element configuration, and the stimulation element
4 configuration is different than the coagulation element configuration.
- 1 5. An apparatus as claimed in claim 1, wherein the coagulation
2 element comprises a coagulation electrode.
- 1 6. An apparatus as claimed in claim 5, wherein the stimulation
2 element comprises a stimulation electrode.
- 1 7. An apparatus as claimed in claim 6, wherein the coagulation
2 electrode defines a coagulation electrode length, the stimulation electrode
3 defines a stimulation electrode length, and the coagulation electrode length is
4 greater than the stimulation electrode length.
- 1 8. An apparatus as claimed in claim 1, wherein the stimulation
2 element comprises a stimulation electrode.

1 9. An apparatus as claimed in claim 1, wherein the stimulation
2 element comprises a stimulation electrode pair.

1 10. An apparatus as claimed in claim 1 further comprising:
2 first and second coagulation element wires connected to the
3 coagulation element.

1 11. An apparatus as claimed in claim 1, wherein the stimulation
2 element is located distally of the coagulation element.

1 12. An apparatus as claimed in claim 1, wherein the stimulation
2 element comprises first and second stimulation elements on opposite sides of
3 the coagulation element.

1 13. An apparatus as claimed in claim 1, wherein the support device
2 defines a first support device configured to be removably secured to the first
3 clamp member, the coagulation element defines a first coagulation element
4 and the stimulation element defines a first stimulation element, the apparatus
5 further comprising:
6 a second support device configured to be removably secured to
7 the second clamp member;
8 a second coagulation element carried by the second support
9 device; and
10 a second stimulation element carried by the second support
11 device.

1 14. An apparatus, comprising:
2 a clamp including a first clamp member, a second clamp member,
3 and movement apparatus that moves at least one of the first and second clamp
4 members relative to the other of the first and second clamp members such that
5 the surgical apparatus has an open state and a closed state;
6 a coagulation element associated with one of the first and
7 second clamp members; and

8 a stimulation element associated with one of the first and second
9 clamp members.

1 15. An apparatus as claimed in claim 14, wherein the coagulation
2 element comprises a coagulation electrode.

1 16. An apparatus as claimed in claim 15, wherein the stimulation
2 element comprises a stimulation electrode.

1 17. An apparatus as claimed in claim 16, wherein the coagulation
2 electrode defines a coagulation electrode length, the stimulation electrode
3 defines a stimulation electrode length, and the coagulation electrode length is
4 greater than the stimulation electrode length.

1 18. An apparatus as claimed in claim 14, wherein the stimulation
2 element comprises a stimulation electrode.

1 19. An apparatus as claimed in claim 14, wherein the stimulation
2 element comprises a stimulation electrode pair.

1 20. An apparatus as claimed in claim 14, further comprising:
2 first and second coagulation element wires connected to the
3 coagulation element.

1 21. An apparatus as claimed in claim 14, wherein the stimulation
2 element comprises first and second stimulation elements on opposite sides of
3 the coagulation element.

1 22. An apparatus as claimed in claim 14, wherein the coagulation
2 element defines a first coagulation element, the stimulation element defines a
3 first stimulation element and the first coagulation element and first stimulation
4 element are associated with the first clamp member, the apparatus further
5 comprising:

6 a second coagulation element associated with the second clamp
7 member; and
8 a second stimulation element associated with the second clamp
9 member.

1 23. An apparatus as claimed in claim 22, wherein the first
2 stimulation element comprises a pair of stimulation elements on opposite
3 sides of the first coagulation element and the second stimulation element
4 comprises a pair of stimulation elements on opposite sides of the second
5 coagulation element.

1 24. A method, comprising the steps of:
2 positioning first and second coagulation elements on first and
3 second clamp members about a tissue structure;
4 forming a lesion with the coagulation elements; and
5 supplying stimulation energy to tissue adjacent to the lesion with
6 a stimulation element on one of the first and second clamp members.

1 25. A method as claimed in claim 24, wherein
2 the step of positioning first and second clamp members
3 comprises positioning first and second coagulation elements on first and
4 second clamp members about at least one pulmonary vein; and
5 the step of forming a lesion comprises forming a lesion around
6 the at least one pulmonary vein with the coagulation elements.

1 26. A method as claimed in claim 25, wherein the step of supplying
2 stimulation energy to tissue comprises supplying stimulation energy to tissue
3 on the side of the lesion opposite the left atrium.

1 27. A method as claimed in claim 24, wherein the step of supplying
2 stimulation energy to tissue comprises transmitting stimulation energy to
3 tissue adjacent to the lesion with a first stimulation element on the first clamp
4 member and returning the stimulation energy with a second stimulation
5 element on the second clamp member.

1 28. A method as claimed in claim 24, wherein the step of supplying
2 stimulation energy to tissue comprises
3 placing a first stimulation element on the first clamp member on
4 one side of the lesion;
5 placing a second stimulation element on the second clamp
6 member on the other side of the lesion; and
7 transmitting stimulation energy to tissue adjacent to the lesion
8 with the first stimulation element and returning the stimulation energy with the
9 second stimulation element.

1 29. A method as claimed in claim 24, wherein the step of supplying
2 stimulation energy to tissue comprises
3 placing a first stimulation element on the first clamp member on
4 one side of the lesion;
5 placing a second stimulation element on the first clamp member
6 on the other side of the lesion; and
7 transmitting stimulation energy to tissue adjacent to the lesion
8 with the first stimulation element and returning the stimulation energy with the
9 second stimulation element.

1 30. A method, comprising the steps of:
2 positioning first and second coagulation elements on first and
3 second clamp members about a tissue structure;
4 forming a lesion with the coagulation elements; and
5 monitoring local tissue activation in tissue on one side of the
6 lesion with an element on one of the first and second clamp members.

1 31. A method as claimed in claim 30, wherein
2 the step of positioning first and second clamp members
3 comprises positioning first and second coagulation elements on first and
4 second clamp members about at least one pulmonary vein; and
5 the step of forming a lesion comprises forming a lesion around
6 the at least one pulmonary vein with the coagulation elements.

1 32. A method as claimed in claim 31, wherein the step of monitoring
2 local tissue activation comprises monitoring local tissue activation in tissue on
3 the side of the lesion opposite the left atrium.

1 33. A method as claimed in claim 30, wherein the step of monitoring
2 local tissue activation comprises monitoring local tissue activation with a first
3 element on the first clamp member and a second element on the second
4 clamp member.

1 34. A method as claimed in claim 30, wherein the step of monitoring
2 local tissue activation comprises
3 placing a first stimulation element on the first clamp member on
4 one side of the lesion;
5 placing a second stimulation element on the second clamp
6 member on the other side of the lesion; and
7 transmitting stimulation energy to tissue adjacent to the lesion
8 with the first stimulation element and returning the stimulation energy with the
9 second stimulation element.

1 35. A method, comprising the steps of:
2 positioning a first stimulation element on a first clamp member
3 on a first lesion surface;
4 positioning a second stimulation element on a second clamp
5 member on a second lesion surface;
6 transmitting stimulation energy into the lesion through one of the
7 first and second stimulation elements; and
8 monitoring local tissue activation with the other of the first and
9 second stimulation elements.

1 36. A method as claimed in claim 35, wherein
2 the step of positioning a first stimulation element comprises
3 positioning a first stimulation element on a first clamp member on an
4 epicardial lesion surface; and

5 the step of positioning a second stimulation element comprises
6 positioning a second stimulation element on a second clamp member on an
7 endocardial lesion surface.

1 37. A method as claimed in claim 35, wherein
2 the step of positioning a first stimulation element comprises
3 positioning a first stimulation element on a first clamp member on a first
4 epicardial lesion surface; and
5 the step of positioning a second stimulation element comprises
6 positioning a second stimulation element on a second clamp member on a
7 second epicardial lesion surface.

1 38. A surgical system, comprising
2 a source of coagulation energy;
3 a source of stimulation energy; and
4 an apparatus including
5 a clamp having a first clamp member, a second clamp
6 member, and movement apparatus that moves at least one of the first and
7 second clamp members relative to the other of the first and second clamp
8 members such that the surgical apparatus has an open state and a closed state,
9 a coagulation element associated with one of the first and
10 second clamp members, and
11 a stimulation element associated with one of the first and
12 second clamp members.

1 39. A surgical system as claimed in claim 38, wherein the
2 coagulation element defines a coagulation element configuration, the
3 stimulation element defines a stimulation element configuration, and the
4 stimulation element configuration is different than the coagulation element
5 configuration.

1 40. A surgical system as claimed in claim 38, wherein the
2 coagulation element comprises a coagulation electrode.

1 41. A surgical system as claimed in claim 40, wherein the
2 stimulation element comprises a stimulation electrode.

1 42. A surgical system as claimed in claim 41, wherein the
2 coagulation electrode defines a coagulation electrode length, the stimulation
3 electrode defines a stimulation electrode length, and the coagulation electrode
4 length is greater than the stimulation electrode length.

1 43. A surgical system as claimed in claim 38, wherein the stimulation
2 element comprises a stimulation electrode.

1 44. A surgical system as claimed in claim 38, wherein the stimulation
2 element comprises first and second stimulation elements on opposite sides of
3 the coagulation element.

1 45. A surgical system as claimed in claim 38, wherein the
2 coagulation element defines a first coagulation element, the stimulation
3 element defines a first stimulation element and the first coagulation element
4 and first stimulation element are associated with the first clamp member, the
5 apparatus further comprising:

6 a second coagulation element associated with the second clamp
7 member; and

8 a second stimulation element associated with the second clamp
9 member.

1 46. A surgical system as claimed in claim 45, wherein the first
2 stimulation element comprises a pair of stimulation elements on opposite
3 sides of the first coagulation element and the second stimulation element
4 comprises a pair of stimulation elements on opposite sides of the second
5 coagulation element.